

## Conference Paper

# Proposal for Psychomotor Development According to A.R. Luria's Conception: New Data in Mexico

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## Abstract

The aim of this work was to test a program for psychomotor development based on Luria's concept of three functional brain units or blocks and the necessity of stimulation of the first functional unit in early childhood. Stimulation of subcortical systems associated with psychomotor and cognitive regulation may help to set the basis for positive functioning of the cerebral cortex in the coming years. Vestibular exercises and proprioceptive stimulation were used. All exercises included significant communicative activity as described by Vigotsky and Lisina, which provide positive direct emotional contact between adult and child. Thirty-six babies with neurological risk were included in the study, along with their parents. After 300 days in the stimulation program, all the children presented positive functional development. We conclude that positive effects of these programs for correction and psychological development may be achieved during the first year of life.

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**Keywords:** neurological risk, emotional contact, joint activity, vestibular stimulation

## 1. Introduction

In our country (Mexico), after stabilized in incubators, children with neurological risk (low birth, prematurity, mother vaginal infection, low apgar), are sent home. It is not really common that children receive any kind neuro-developmental care as a prevention strategy. As a result, children spend several weeks without professional attention that is essential for early psychological development. The families are normally not aware of any probable consequences until the monthly pediatric checkup. Medical attention is certainly essential for the child's future, but intervention in psychological development is also critical for the acquisition of superior or complex organized behavior [1].

Neurodevelopment programs for newborn children are an important interdisciplinary task for neuropsychology, pediatrics, and developmental psychology. We are

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convinced that the best solution is not to try to deal with problems 'when the problem arises', but a preventive approach. This idea is based on the conception of the zone of proximal development proposed by [2].

In this article, the authors report on an original program for early psychological development based on joint actions involving psychomotor functions and positive emotional contact between adult and child. Psychomotor functions were considered as complex elementary movements according to the conception of [3]. The main difference between Katona's conception and our program is our inclusion of elementary movements in the joint actions of adult and child, oriented toward positive emotional goals according to activity theory, considering object and subject as essential elements of a child's activity [3].

## 2. Methodology

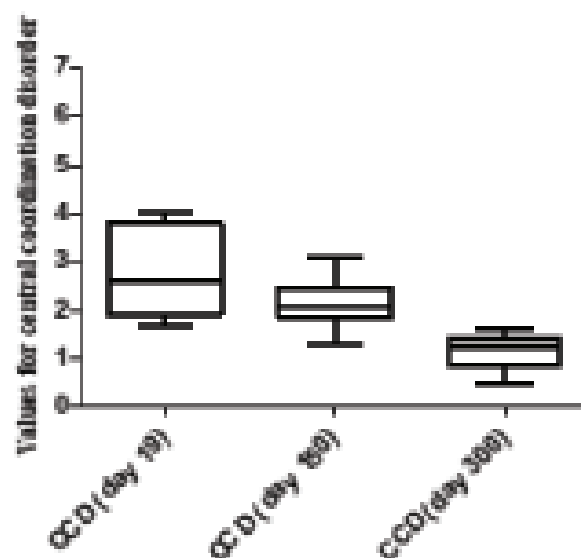
**Participants:** Thirty-six newborn children with low birth weight were included in the study. All were assessed by a pediatric and neonatology service. All babies spent an average of 18 days in an intensive care unit to decrease vulnerability to disease. **Instruments:** two instruments were applied for assessment of development during the first year: Vojta developmental scale to measure 'central coordination disorder', within a scale of 1 to 7, where 1 means mild central coordination disorder and 7 serious central coordination disorder [4] and Hellbrügge psychomotor development estimation scale [5]. **Sample:** All children were systematically attended by the hospital's neonatology service. The parents were asked to speak with a highly positive emotional tone and expressive attitude toward the child. The adults were instructed to smile, talk clearly, loudly with positive emotional expression and precisely to their children. They could sing songs or rhythmic melodies or just speak kindly to the children during the exercises in order to attract the child's attention to an object or person. The stages of the program were the following: stimulation of tumbling reaction, stimulation of the straightening reaction, facilitation of back-neck-shaft straightening, facilitation movements for crawling and tumbling reaction. The parents were suggested to fulfill such tasks several times daily. It was important to realize such activities in comfortable conditions, good humor and in situations non-related to alimentation of the child. All adults were trained with explanation of all details of the treatment before the inclusion on the program.

### 3. Results

General results of application of proposed program for care were positive. It is important to note that the parents learnt not only how to do the therapeutic exercises, but also changed the whole manner of their relationship with their children. Positive emotional contact was accompanied by gradual inclusion of more complex postures and motor abilities. Parents could appreciate stable eye orientation and improved general attention. Positive changes in psychomotor development were observed from the first to the second assessment and from the second to the third (final) assessment after the completion of the program. The first Vojta Scale evaluation of complex elementary movements showed an oscillation of values between 1.8 and 4.0, which indicates that the deficit of movement ranged from mild to which permitted to precise general assessment of general pediatric condition of each baby. The treatment was explained to the parents in detail. The study was carried out under the ethical and social norms and responsibility issued by the General Hospital of Cholula, Puebla. The participants were selected according to the expert judgment criteria applied by pediatricians. **Procedure:** 1. Children were evaluated in the intensive care unit by neonatology services, 2. Neuro-development evaluation was applied to each child with the help of the Vojta Scale in order to estimate the central coordination disorder [4]. 3. All parents were trained and the content of the program was explained to them. A specialist showed them each exercise in order to provide individual competence. The parents were told how to do each exercise at least three times daily before feeding the child. The program was created and approved by the neuropsychology and neuro-developmental service of the General Hospital in Cholula Puebla. This service is an initiative of Master program in Neuropsychology of Faculty of Psychology of Autonomous University of Puebla (Mexico). During the application of the program, all children were checked every week in order to ensure their progress through the program and to help the parents understand and better perform all the exercises. An expert supervised the performance of the exercises through individual weekly sessions. The program started on the 19<sup>th</sup> day after the child's birth and initial assessment took place on that day. The subsequent assessments by the Vojta Scale were on the 150<sup>th</sup> and 300<sup>th</sup> postnatal days, to estimate progress in general development. Additionally, the Hellbrügge Scale was applied to establish functional psychomotor age [5]. After conclusion of the program, final assessment was carried out. **Content of the program:** All exercise consisted of joint actions between adult and child. The content of the stimulation program were: stimulation of tumbling reaction, stimulation of the straightening reaction, facilitation

of back-neck-shaft straightening, facilitation movements for crawling and tumbling reaction.

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**Figure 1:** Central Coordination Disorder Assessment.

No abbreviations were included.

## 4. Discussion

One of important conclusions states the obligatory usage of concrete objects and toys from the very beginning of the work with the program. All exercises of our program

constantly included external objects, verbal motivating expressions by an adult. Such exercises included naturally coordinated movements of the child stimulated by an adult. All exercises were carried out in an expressive and positive atmosphere, creating the possibility for constant involvement of the baby in the joint activity with an adult. This strategy is based on the psychological analysis of early infancy [6–8]. Such conception helped to create a positive zone of proximal development for daily emotional cooperation between adult and child and to achieve a gradually better response during all proposed tasks from the babies. An additional psychological effect of the program was the disappearance of negative impulsive reactions such as irritability, weeping, excessively frequent breathing, and chaotic movements of the legs and arms with no apparent goal. All the babies were able to direct the movements of their eyes to external goals or according to the emotional attraction of an adult. External goals were always established and oriented by adults.

For example, the own mother's image and voice improved the child's performance during therapy exercises, produced guided sensory orientation effects and fostered a constant motor orientation. Thus parents should be trained both how to do the exercises and also on how to interact effectively [9].

We might say that the right development of the motor system always includes visual fixation and tracking, along with the animation complex [7, 10]. Actually, we might suppose that all movements of the child are included in this animation complex as essential material basis of activity of non-verbal emotional communication between adult and child. This psychological disposition of such little children (babies) for immediate environment interaction can be considered as a basis for further formation of more complex functional systems, which combine the proprioceptive, vestibular, and cerebral stem systems [11]. Together with appearance of animation complex, complex functional system for positive emotional communication appears. At the same time, it is not possible to assume separate maturation of the psychomotor system without inclusion of high levels of cortical regulation [12]. We can say that the animation complex is an essential basis for further development of voluntary actions of the child. The appearance animation complex means, at the same time, disappearance of impulsive movements without any kind of direction or proposition.

On the one hand, it is possible that we are speaking about the functions included in the primary functional unit [13] on the other, according to Luria's conception, no action can be performed with the participation of only one functional unit. This logic makes us believe that the program applied in the study permits better consolidation of coordinated efforts between the first and third functional units [14]. Such coordination

can be achieved according to the external objective of the actions proposed by the adult to the child within joint positive emotionally communicative activity [6].

On the other hand, the results obtained in the study suggest that it is possible to start stimulating development at the very beginning through joint activity between adult and child. Later on, such joint activity of emotional non-verbal close communication will become a basis of great importance for appearance and further development of regulation systems of behavior of the child [15]. We could claim that early organization of joint activity between adult and child, always initiated by an adult, permits positive results in communicative activity by itself, as was already demonstrated by the authors of historic and cultural psychology [6, 8, 16]. Our results point out a clear relation between the development of the nervous system and the level of psychological activity. Positive emotional communication and interaction may require the whole motor sphere, the system of equilibrium, tonic activation, and emotional regulation of activity. The necessity for research into diverse levels of childhood activity has been expressed clearly by the theory of cultural activity [7, 17].

The program for stimulation of early psychological development, fulfilled as oriented joint activity between adult and child and not as isolated movements, may be understood as an essential part of the communicative activity necessary for children with neurological risks because of unfavorable birth conditions. Finally, we may say that higher regulatory centers may be involved in cultural actions on this basis, and simultaneously with their direct interactions with subcortical systems of the brainstem and midbrain [1, 12].

## 5. Conclusions

Program for development of psychomotor development in early age should be included into the basic kind of psychological joint activity between adult and child. Such an activity is close emotional positive communication between adult and child. Cultural significant external objects, as external means of child's activity, are very important from the very beginning. Specialists should provide meaningful inclusion of parents as conductors of such program of care, as this psychological age is a unique period of child's development with unique social situation of development. Within this situation, the child totally depends on a kind of social joint interaction provided by an adult.

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